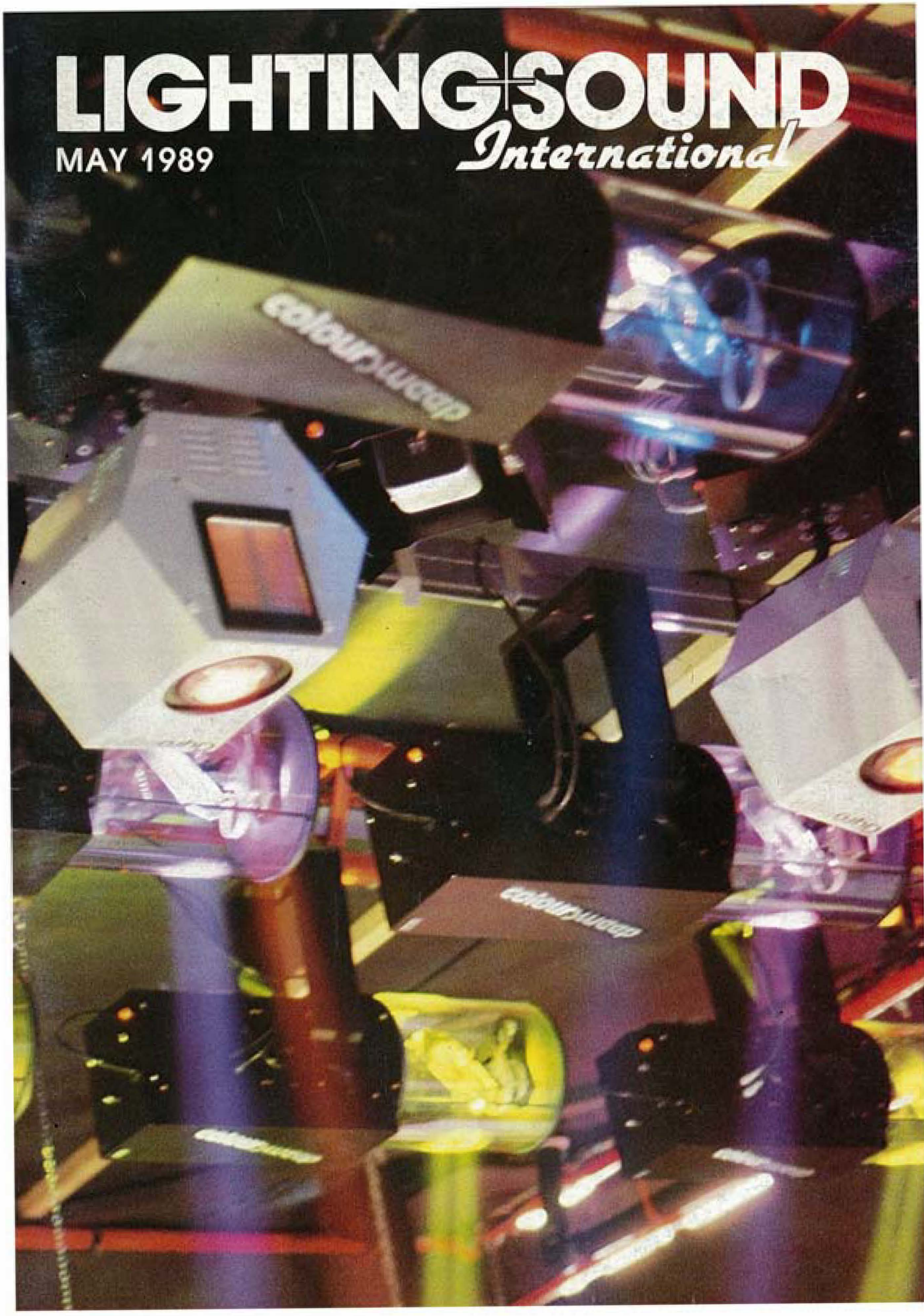


LIGHTING+SOUND

MAY 1989

International



Aspects of Love: the Lighting

Julian Williams talks to Mike Odam and David Edelstein, two of Britain's leading technical-specialists who have worked behind the scenes on Andrew Lloyd Webber's latest creation.

The pressures brought to bear on those involved in the putting on of the so-called 'mega musicals' are enough in themselves - but in the mounting of a new Andrew Lloyd Webber production, those pressures can be overwhelming, as every technical department endeavours to fit in with the other to meet the expectations of such a high budget production with a known advance, and a theatre booked for an expected minimum three year run.

Aspects of Love is just a part of Mike Odam's and David Edelstein's busy schedule, and though each cover entirely different sectors of the industry, they come together representing their companies as part of the technical team who put on this lavish musical. Preparing 'Aspects' took a 12-week period from get-in through to press night on 17th April at the Prince of Wales Theatre in London.

The show itself is a musical based on the novel by David Garnett, and a relatively small-scale piece portrayed in light operatic style.

Limelight Services, whose Mike Odam was responsible as production electrician, had a brief which required him to be in the theatre throughout the whole production period, and to make sure all the lighting equipment worked on cue.

In this case, lighting designer Andrew Bridge, whose documentation of the design for any show is highly detailed, produced a schedule and layout of equipment some four weeks into the fit-up for Mike Odam to cable up and assess the necessary dimmer and plugging requirements, and get to the stage where a full brief of equipment required could be given to Theatre Projects Services.

Such provision for a trademarked show - now that the GLC require only three months to pass before a show is 'permanent'

- necessitated the equipment being permanently installed for a run of some considerable time.

Mike Odam explained: "The entire FOH outlets were disconnected at the dimmer room and channels were re-routed to the stage. All the FOH circuits were run to new positions from a separate dimmer room with its own mains intake, providing for 112 ways."

Armoured multicores were run to each location, where the exact number of circuits was required in the new positions, being integrated with some special stage lighting, to the proscenium boxes, rear balcony, circle front, and the inclusion of a neatly installed mid-auditorium bridge with a couple of follow spots housed at one end.

"We had to put more dimmers backstage with armoured multicores to suitable points and hardwired as close as we could to the various stage positions," said Odam. "Looking at the lighting plan, it changes every day, adding and subtracting lanterns!"

Asking him about some of the most difficult tasks, he mentioned the cyc position which was awkward to install due to the shallow depth of the stage area. At the back of the set is a 30 foot curved brick wall, which to stunning effect splits as the top half flies out - revealing the tops of a mountain range, complete with gauze! Because of the 'zig-zag' shape of the 'wall' the lights had to be appropriately staggered around the back behind the curved sections of the wall to light the mountain range with specially adapted MR16 'Howie' battens, along with the use of Par batten sections.

The false front header above the forestage also houses these special lighting units which are like light boxes illuminating the inside of the set.

Because of this header, the first five lighting positions are downstage of the iron, with the

first spot bar on bar 6. It is a tightly packed show in the grid, without any space allowed for light bars. "Aspects has 44 scenes, so for this reason Strand's PALS system goes towards providing most of the lighting work," explained Mike Odam, "with the other units producing the gobo washes and effects."

Not yet working on the new custom-designed Galaxy Motion panel, due to current teething problems, but temporarily controlled from an IBM computer, the ultimate concept of PALS is to integrate the 'moving light' with the ordinary stage lighting on the expanded Galaxy control board, using a single operator.

"They had two systems for setting up the show, with a stalls control pod for the motion, with record and playback facilities, in addition to the facilities on the Galaxy main board. Problems occurred with the two operators trying to record on to the same Galaxy crate," said Mike Odam, though he expects them to eventually run on the Galaxy - but with two operators. The light curtains were also adapted to make the individual lamps focusable to 'fan out' the light output.

Due to the limited time available for him to organise rigging around the 24 hour use of the stage by various departments, his crews were split into two shifts, with up to 15 on the night crew!

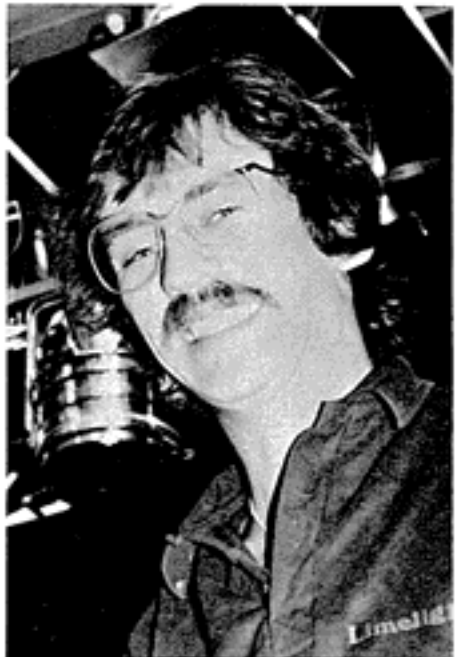
In discussion with David Edelstein of Triple E during rehearsals, he explained how his rotating screen drive mechanisms had been designed to move the set of louvre-shaped screens, which are a principal feature of the sets.

"There are two tracks at the mid-stage area, which are 16 metres long," said David. "On each track there are four linear motors, making a total of eight altogether, housed in

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David Edelstein.



Mike Odam.



From 'Aspects of Love': Giulietta's studio in Venice.

photos: Clive Barda



Building the wall.



In the garden at the country house.

a purpose designed chassis. Underneath each linear motor is a conventional permanent magnet driving a gear box which gives you a vertical shaft. Hanging from that vertical shaft are the eight screens - one to each rotary motor. The screens are 20 feet high and seven feet wide and stack at 90 degrees to the track in the stage left wing."

Control of the 16 motors is by a computer, the result of which allows the screens to be used in a series of shapes across the stage, either straight on or at angles to the track. The control for each linear motor can be set to stop within a millimetre at any desired

position along the 16 metre track. Also, the acceleration and deceleration distance can be set for each linear motor for each sequence, and at one metre per second. The weight of a combined linear and rotary motor is 50 kilos, and the screen that is hanging from it is 75 kilos, so each unit is therefore 125 kilos total in weight.

The rotary motor has two encoders: one on the back which governs the speed in giving acceleration and deceleration distances, and a second encoder, fixed on the shaft itself, is a 360 encoder with a built-in limit switch for the positional control of the

screen. With a maximum speed of 12 rpm you set the angle of the screen that you want it to end up at, and the position on the track where it goes.

"Using the computer is like painting a picture," said David Edelstein. "With a 40 megabyte memory hard disc this allows for almost 1000 potential sequences. Each sequence can include a series of actions, which might be the eight screens moving to a linear position along the track, when they arrive, and the link to the next action as either a positional link or a time link. For example, if screen 1 gets to 14.5 metres, all the



Rose and Alex in the café at Montpellier.

screens rotate to a set position or you can take a link to any of the other screens.

"The computer gives complete control over the motors, where they go and where they stop, and what angle they end up at. When it is programmed, you can first run the sequence on the graphic simulator and see if any of the screens are going to hit each other!"

Although Triple E have had the inevitable

teething problems to overcome, it has taken them just two months to refine the system.

Aspects of Love is an extremely subtle production that has been mounted with high expectations, assured by the fact that it has drawn together many experienced elements of British technical and creative expertise. And Mike Odam and David Edelstein and their companies are just two of the reasons why.

Note: Triple E's linear motor system was launched in 1987. It won the ABTT Product of the Year Award in 1988.

Additional credits:

Lighting hire equipment: Theatre Projects Services Limited

Electrical installation by Excel Electrical Co. Ltd.
Lighting effects by Howard Eaton Lighting Ltd.
Assistant to the lighting designer: Hugh Vanstone
Production design by Maria Bjornson

ASPECTS OF LOVE

Lighting Equipment (as at opening night)

(list courtesy Theatre Projects Services Ltd.)

Lanterns

Cantata 18/32	30
Cantata 26/44	38
Cadenza EP	12
Cantata PC	3
Prelude 28/40	6
Leko 4.5 x 6	2
Leko 6 x 9	57
Leko 6 x 12	50
Leko 6 x 16	31
Leko 6 x 22	4
Sil 15 1.2K	4
Par 64 L/N	23
Par 56 S/N	87
Par 36 S/N	3
Par 56 batten	6
Howie batten	56
Minuette fresnel	42
Minuette PC	18
Patt 23	22
Patt 743	4
Patt 23N	2
Patt 123	1
Ianiaro 5K	1
ET 1000W	1

M16 Microflood

Par 46 internally transformed

Accessories

boom arm
Leko top hat
Par 56 top hat

Truss

5'	111
10'	85
15'	54
20'	49
25'	25
30'	39
40'	32
50'	33
60'	10
75'	10
Grelcos	175
3 way Lumex	31
series splitter	43
5m Lectriflex	2
10m Lectriflex	13
20m Lectriflex	8
30m Lectriflex	7
50m Lectriflex	4
staggered female spider	18
female spider	3
male spider	12
stage box	6

Mains

100' 32A 10 Cee/Cee
50' 32A 10 Cee/Cee
120V 500VA transformer
12V 225VA transformer
Superswitch
10' x LR
individual fader
4 way CG rack
4 way CG desk
10' Bleecon
50' Bleecon
Bleecon Grelco

Effects

storm cloud discs
fleece cloud discs
3.5" lens
4" lens
5.5" lens
adjustable mask
divertor mirror
Bowen strobe
Sil 30 strobe
Cantata gobo rotator
KK wheel
Minimist
12" mirror ball
24" mirror ball
Sil 30 Coloursette
individual controller

Pani BP 1.2K
dimmer shutter
film drive unit
18cm lens
60cm lens
extension rod
Pani 500W beamlight
24V transformer
Solo 2K followspot
Rigging
large Tallescope
4'6" HB
swivel arm

PALS System

Cantata PC PAL
Cadenza PC PAL
independent colour changers
data distribution units
power/data boxes
5m data cables
stalls pod complete
Galaxy keyboard
additional memory in Galaxy

Dimming

Permus 24 x 10A
Permus 12 x 10A
Permus 6 x 20A
Permus 12 x 20A
Permus 24 x 20A
Permus kits

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Aspects of Love: the Sound

Tim Frost talked to sound designer Martin Levan during set-up at the Prince of Wales Theatre.



Martin Levan at the CADEC desk during set-up.

From *Cats* onwards, Martin Levan has been designing both the sound and the sound systems for Andrew Lloyd Webber's mega musicals. The latest show to hit London and, no doubt move on to Europe, America and the Orient is *Aspects of Love*, which opened at the Prince of Wales Theatre in London on 17th April.

The new show is on an altogether more intimate scale than, say, *Starlight Express*. The sound of *Aspects* has been designed to reflect the mood, and relies on invisible reinforcement rather than up-front PA. That is not to say there has been a minimalist approach to the sound system. The final package which is being rented from Autograph Sales, is costing in the region of £400,000.

While putting on *Aspects*, Martin Levan is still involved in the new renderings of *Cats* and *Phantom of the Opera*, that are opening up all over the world. I caught him at the theatre two weeks into the installation. He had been Paris the day before, sorting out the system for the Paris opening of *Cats*.

"Those are very much versions of the same show. Once you've done the sound design in London, you find there are *Phantom*s opening up all over the world. They are a bit less work, but there is still a lot to do.

"A brand new show requires a vast amount of time and energy spent developing the ideas. When you design a show, you set up a character that stays with the show. The basic concept is there, the shape and the style of the show. We have very different sound systems, as the shows are very diverse. *Starlight Express* and *Phantom of the Opera* are about as diverse as you can get, and require very different treatment," he explained.

Martin works in close collaboration with the writers and director, designing the sound within the development of the show. For *Aspects*, the main reinforcement system carries through ideas tried out on *Phantom of the Opera* two years ago. Instead of using commercial PA systems or even boxes to his own designs, Levan's main speakers are

studio monitor drivers used open, without any form of box at all. The drivers are mounted either on the aluminium plates, using the bolts that hold the magnet, or in an open frame with nothing that impedes the sound from the speaker.

The idea came as one of those good-ideas-at-the-time. The sound is there to energise the air rather than fighting it, creating an open feel that is considerably less directional.

"I wanted to create a speaker system that didn't create a focus to it - a fairly omnidirectional system. It seemed like quite a nice idea. We did some experiments with it, and running the drivers from about 200Hz up it gave a very open sound with all the colouration gone. All the perceived wisdom about feed-back problems and units blowing up - none of these things came to light at all. I've had just as many feed-back problems with clusters and tight arrays. We were ready for the problems, but they never occurred."

The open speakers are four each side of the proscenium with four more at the top. The drivers are a mix of Tannoy and Urei studio monitor dual-concentrics. Although the show isn't heavily amplified, each speaker has its own Yamaha 2602 to give the system adequate headroom.

Each driver has its own $\frac{1}{3}$ octave graphic equaliser, which will be set up in 'real time' during the rehearsals.

"I don't take a great deal of notice of what it says on an analyser," Martin Levan emphasised, "as long as the show sounds good. The only time you see me with a pink noise analyser, or a TEF, is if there is a specific problem to test for. There is a $\frac{1}{3}$ octave eq on virtually everything, but sometimes it doesn't get used very much. I guess 75% of them are used. You have to have them there as you may only get two or three goes at a particular scene before you've got an audience. You need to have the gear to hand to be able to make fast changes."

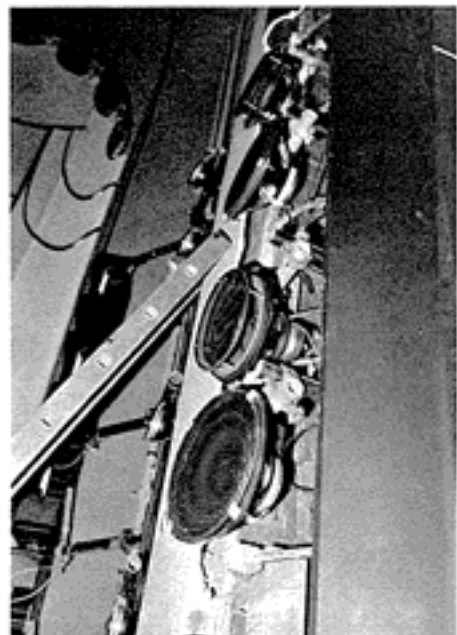
The Urei's are passively crossed over. This is the first time they are being used in this particular situation. Martin Levan had the option of spending time researching out an active crossover system for the Urei's, but felt the time was better spent working on parts of the system that would have more impact on the overall sound. The same situation happened with the Tannoys. In the London installation for *Phantom*, the Tannoys are crossed over passively, but as time pressures reduced, he was able to research active crossovers and now all Tannoys are actively driven using one channel of the 2602 for LF and the other channel for HF.

Open drivers have virtually no useful output below 200Hz or so, therefore the bass is dealt with by a separate array of speakers. Next to the dual concentrics are a line of Bose 303 sub-bass units which, in turn, are reinforced by a pair of Bose Acoustic Cannons flown high, house side of the proscenium.

The 303s are run up to 300/400Hz, although they don't put a lot of energy into them at that level. But as they become a little directional, it is fairly important where they are placed. The 303s were first used in Japan, and Martin Levan uses them because they're compact and "... they do sound rather nice." Around the stage, space is at a premium so the size of the Bose was an important factor.

The aim is to make the system completely invisible to the audience. Panels in the set have cut aways with scrim panels to let the sound through. To maintain the intelligibility and keep the sound's sparkle, there are rows of 2" and 3" dome tweeters mounted on the underside of the circle. These are also used without boxes.

"Whenever I used little speakers like Bose 101s or Control 1s, I'd always graphic them to turn them out like a tweeter. The choice of using dome instead of a full range speaker was from the feeling that we didn't want the colouration of a box, especially when you only need the system for the top end



Open chassis Urei drivers with Bose 303 in background.

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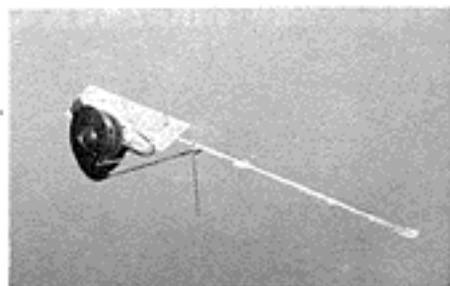
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Ceiling-mounted Dynaudio 3" dome tweeter.

anyway. When you're underneath an overhang like this, it is primarily the high end you need to fill in. If you try and fill in full-range, you can get into all sorts of focus of attention problems. Upstairs we are using JBL Control 1s, but will probably graphic them so there's not much low end left."

The delays are set on the long side, which helps to focus even more on the performer on the stage. But the amount of the delay depends on the type of show. With Starlight, where it's a tight, bright rock sound, it has to be set exactly. But with a sweet orchestral sound you can get away with a longer delay.

In fact, the band is surprisingly small. A string quartet, woodwind, horns, harp, grand piano and a couple of synths - 14 players in all. The band and the performers are mixed through an automated 56 channel CADAC E series desk with several special features.

At the stage I saw the system, two weeks into the installation, and a week to go to rehearsals, Levan had fired up the computer for the first time. The software had been transferred to run on a PC computer. Everything worked first hit, albeit with a fractionally slower reaction time. The desk has programmable faders throughout the input side, 12 main outs and 10 subs. What is very new is the special programmable routing module developed for Levan by Clive Green at CADAC.

Although the very big desks, like the one installed at the National Theatre, incorporate automated routing as part of the overall automation system, it is the first time such a module has been incorporated in a more 'ordinary' theatre desk. The routing system can patch an input to any of the group or sub-groups, or any of 10 special direct outputs. The system is going to be used primarily for on-stage special sound effects.

A single NAB cart machine will be used as the effects source. The destination of each consecutive effect will be automatically selected by the module under the control of the main computer. The overall effects path has taken up a certain amount of thought in itself. Even at this stage there is still a possibility that hardware may change once rehearsals get under way.

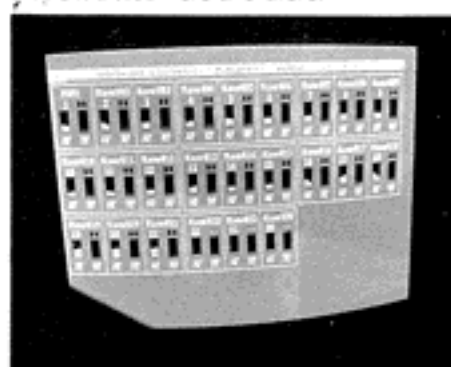
"The effects may well come from carts. Over the years we've played around with all sorts of ways of doing effects. We have used 8 track tape for Phantom, London and 16 track on Phantom, New York, LA and Toronto. But unless there is a special job that NAB carts can't deal with, I like to use something that is very simple and reliable."

In fact, the effects channels are the only area where boxed speakers are being used. There is a mix of Apogee AE3s and AE5s placed within the set for specific effects. The Apogees were chosen for their high output, relative to their size and for their clean sound and tight directional pattern.

Voice mics are all Sennheiser radio mics - 21 in all - generating their own set of problems. The receivers are placed under the stage, with the aerial cables kept as short as possible, to minimise the losses between

aerial and receiver.

"With the radio mics, we are always trying to squeeze that extra 1/2dB out of the signal strength. When the mics are placed on the body, you lose even more of the very limited power so you are scraping around for that extra 1/2dB here and there."



Sennheiser radio mic monitor screen.

Another new device to London, is a display system developed by Sennheiser for the multiple microphone system. There are video monitors both by the mixer and at the side of the stage. Both monitors can display the RF and audio outputs of up to 27 receivers. Since it is a diversity system, each display cell has a pair of bar graphs for the RF and Audio and there is space to 'name' each of the channels with the character using the mic. From the display, it is very easy to see if there are any problems. The stage side monitor has a key pad so that the sound operator dealing with the mics, can monitor the output of the receivers on his headphones. For more obscure problems, Martin Levan has video taped the monitor so that he can analyse the radio microphone's performance after rehearsals.

The CADAC computer plays an important part in the management of the radio mics, with automated group selection of the channels so that they can quickly re-group radio mics on stage depending on the scene. The automation is an essential part of the show freeing the mixer for more creative work.

"I'm a great believer in one man mixing," confided Martin Levan. "With 21 radio mics coming in and out all the time, you're mixing a band and you're mixing the show - you've got a lot to do. The computer deals with all the mechanics, leaving time for the creative work. The show has to be performed at the desk."

The technical sophistication is used as a tool, just a means to a creative end. "You do a design for a show, you want to do more all the time, deal with some problems that came up on the previous show."

"If it gets a bit more complicated then you have to add a bit more automation so you have freed yourself to deal with the important tasks. Creative work is always like that. You want new challenges and you want to explore new areas. You can't stand still. If you don't do it, someone else will."

Equipment

CADAC E Series computer theatre desk with 56 inputs, 12 groups, 10 subgroups
1 Yamaha MC1608M mixer
3 Yamaha MV802 sub mixers
1 Yamaha DMP7 digital mixer
1 Akai MB76 mix bay
72 Yamaha PC2602, PC1602 and P2075 amplifiers
24 Tannoy 15", 8" and 6.5" dual concentrics
6 Urei 15" dual concentrics
11 Bose 303 sub woofers
2 Bose acoustic wave cannons
9 Apogee AE3, AE5
55 Dynaudio 2" and 3" dome tweeters

8 JBL Control 1s
26 Yamaha Q2031 and DEQ7 Graphic Eq
8 Yamaha REV 5 reverbs
2 Yamaha SBX90 processors
5 Klark Teknik DN17 delay lines
21 Sennheiser SK 2012 bodypack transmitters
42 Sennheiser EME 1036 diversity receivers
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